



Blood Transfusion and Blood Products

Janette Linke, RN, MSN
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Blood Transfusion Centers

- Most of the nation's blood supply is collected from volunteer donors
- Donors are eligible to give whole blood five times a year and can donate some blood components, such as platelets, more frequently



Blood Groups

- Group A
- Group B
- Group AB
- Group O

Blood Group	Antigen	Antibody
A	A	Anti-B
B	B	Anti-A
A & B	A & B	None
O	None	Anti-A & Anti-B

Amount of blood products transfused at the LAC+USC MC in 2010

- 18,776 Red Blood Cell (RBC) units (\$250.00 each)
- 4045 Platelets Pheresis (Platelets) units (Apheresis or single donor platelets) (\$465.00 each)
- 10,512 Plasma units (\$31.00 each)
- 2,753 Cryoprecipitated AHF ("cryo") (\$40.00 each)
(36,086 Total Components)

Most Common Uses for Blood

- Coronary Artery Bypass Surgery
- Hip Replacements
- Bleeding Ulcers
- Brain Surgeries
- Aneurisms
- MVA
- Organ Transplants

Transfusion Safety

- Involves the overall process of administering blood and blood products to a patient.
- Transfusion of the wrong blood and blood products remains the most common hazard of transfusion and one of the most likely causes of transfusion related death.

National Patient Safety Goal

- The Joint Commission has developed a National Patient Safety Goal (NPSG) that relates specifically to the safe administration of blood.
- **NPSG GOAL #1: IMPROVE THE ACCURACY OF PATIENT IDENTIFICATION**

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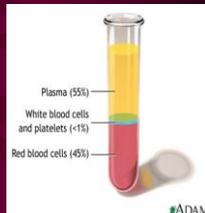
Transfusion Safety

- It is thousands of times more likely to have a transfusion of the wrong blood or blood product than transfusion-related transmission of hepatitis and HIV.
- The two most common errors
 - Mislabeled/miss-collected blood samples
 - Miss-transfusion

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Blood and Blood Products

- Red blood cells
- Plasma (FFP)
- Cryoprecipitate
- Platelets
- Factors 7, 8, 9.



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Blood Products



Contraindications for transfusion

- Fever is **RARELY** a contraindication for transfusion.
- A febrile non-hemolytic transfusion reaction is defined as a rise in temperature greater than 1°C or 1.8°F from a pre-transfusion level of not lower than 37°C or 98.6°F when no other explanation for the fever exists.

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Transfusion Rates

- Transfusion rates vary with the patient's clinical condition.
- An 18-gauge needle provides good flow for red blood cells
- Platelets, plasma and cryoprecipitate are given faster than RBC's

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Transfusion Rates (cont.)

- Smaller needles can be used for patients whose larger veins are inaccessible
- Forced flow under high pressure through small lumen intravenous access may damage red cells.

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Cultural/Religious Considerations

- Religious/personal preferences must be considered for the adult and in the case of a child, the parent/guardian.

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Non – Emergency Situations

- Patient is informed of transfusion options by a physician in compliance with the Paul Gann Blood Safety Act.
- The physician must inform the patient of the positive and negative aspects of receiving either autologous or allogeneic
- The physician must obtain a transfusion consent

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Type and cross collection

- Draw blood for type & cross as ordered
- Ensure 2 licensed personnel (RN, LVN, PA, Physician) double check patient identity by matching the patient's name band with the label on the tube
- Check to make sure the label matches the patient when drawing a type and cross.
- Both personnel initial on the affinity type and screen order form

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Prior to obtaining blood/blood product

- Verify physician has obtained a signed transfusion consent and contact physician immediately if consent documentation has not been completed.
- Verify patient will accept transfusion
- Ensure patient has received pamphlet "If You Need Blood" (given by physician)

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Prior to obtaining blood/blood product (cont.)

Check blood/blood product order

Order to include:

- Type of blood product
- Number of units
- Administration rate

Containers used for blood and other specimens are labeled in the pt.'s presence

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Prior to Transfusion (cont.)

- Complete transfusion order form and validate it's contents with a second licensed person (RN, LVN, PA, Physician) to ensure it correlates with the physician's order.
- The 2 licensed personnel (RN, LVN, PA, Physician) identify patient **AT THE BEDSIDE**. Using two patient identifiers

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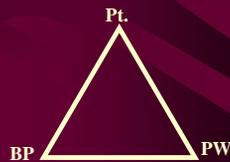
Prior to Transfusion (cont.)

- When using a two-person bedside or chair-side verification process, one of the individuals conducting the identification verification must be the qualified person who will administer the blood or blood product to the patient.

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Prior to Transfusion (cont.)

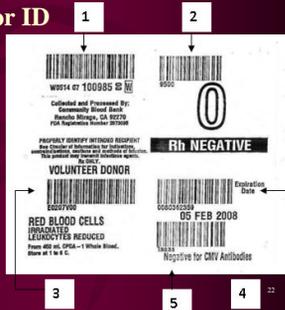
- Ensure that 2 licensed personnel (RN, LVN, PA, Physician) match the right patient with the physician's order with the blood unit and the Blood Product Record.



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Information on Blood Bank Product Record and Blood Component Bag

1. Unit number/Donor ID
2. Donor ABO/Rh
3. Component
4. Expiration Date
5. Special Testing (e.g. CMV)



Prior to Transfusion (cont.)

- Assess vital signs, mental status, IV site and patency no more than 30 minutes prior to transfusion.
- Visually inspect the blood product to look for clots, color changes, or other abnormalities
- Pre medicate the patient as ordered

Pre-transfusion medications

- The most common medications used pre-transfusion are:
- Diphenhydramine (Benadryl)
- Acetaminophen (Tylenol)

Prior to Transfusion (cont.)

- If any discrepancy or abnormality is found, the transfusion must not be initiated until the discrepancy is resolved or abnormality is explained.

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Prior to Transfusion (cont.)

- Ask patient to state full name (if possible) and match it with identiband
- Compare and verify patient identiband (full name and MRUN) matches component bag and blood product record.

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Prior to Transfusion (cont.)

- Ensure the following information on Blood Bank Product Record and blood component bag (both bag labels) matches:
- Name and MRUN
- Patient ABO/Rh
- Donor ABO/Rh
- Expiration date
- Component type
- Unit number

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"What is the Bloody Mary made with? A? B?
Rhesus negative? The menu doesn't say."

Administration of blood and blood products

- Follow physician's order when administering blood and blood products.
- Infusion rates vary according to patient and situation.
- Use administration tubing with proper filter **ONLY**
- Slower rates may be necessary for patients with a compromised cardiovascular system

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Administration of blood and blood products (cont.)

- Change blood administration tubing every 4 hours or sooner if debris in filter impairs flow
- Blood administration tubing may be used for more than one unit of the same blood product
- When using an infusion pump, use appropriate manufacturer tubing and filter

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Blood Warmer

Indicated to use Blood Warmer for patients that have any of the following:

- Temperature less than 97.8 F or 36.5 C
- Receiving greater than 4 units/hr of RBCs



Administration of blood and blood products (cont.)

- Administer blood product with 0.9% Sodium Chloride (NS) **only**
- Flush IV line with NS before and after the transfusion
- Do not administer any medications through blood infusion line during transfusion

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Administration of blood and blood products (cont.)

- Each unit of RBC's is normally administered over 2-4 hours*
- Platelets must be transfused within 1 hour of issuance
- If administration is interrupted, return unused blood to the Blood Bank
- When administration is completed, dispose tubing and bag in the red container

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Blood Administration in Outpatient Settings

- Elective transfusion in the outpatient setting (excluding emergency rooms)
- Transfusion should be started no later than three hours before the clinic closes
- Patients should remain in the clinic for 30 minutes after transfusion
- Patient education must be provided prior to patient leaving the clinic

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Administration of blood and blood products (cont.)

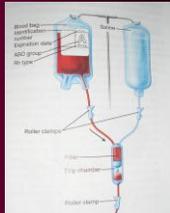
- Be sure to sign, date, time and chart the transfusion in the patient's record, upon starting the blood transfusion

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Ongoing Assessment

Re-assess patient's vital signs:

- No more than 30 minutes before administration
- After 15 minutes or 50 ml of administration
- Within 2 hours of transfusion completion
- With any signs and symptoms of an adverse reaction



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Blood Transfusion Policies

- Return unused (not spiked) blood to the Blood Bank within 30 minutes
- DO NOT store products in undesignated Blood Bank refrigerators
- Notify M.D. Immediately S/S of transfusion reaction or persistent abnormal labs

Ongoing Assessment (cont.)

- Assess for the following adverse reactions a minimum of q 1 hour during transfusion:
 - Anaphylaxis
 - Hives, itching or rash
 - Back/chest/flank pain
 - Fever (unexplained rise >1.8 ° F or 1° C)
 - Chills
 - Red urine
 - Shortness of breath
 - Restlessness/ Anxiety

Hives, Itching or Rash

In the event of the patient developing hives, itching and rash, follow these steps:

- Stop transfusion and disconnect at catheter hub
- Leave administration set hanging at bedside until physician evaluates patient
- Keep primary IV line open with normal saline
- Re-check identification of patient and compare to blood component bag and Blood Product Record

Anaphylactic Transfusion Reactions

Symptoms usually occur with less than 10ml of blood transfused:

- Abdominal cramps
- Dyspnea
- Vomiting
- Diarrhea
- Tachycardia
- Flushing
- Urticaria
- Wheezing, laryngeal edema
- Hypotension



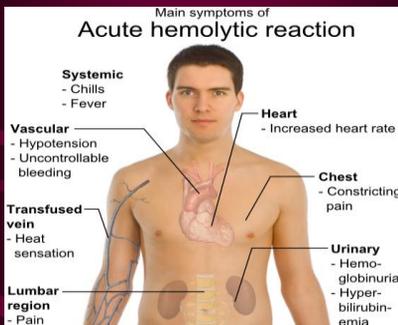
Figure 2—Urticaria. These raised, red, itchy welts of various sizes appear in response to histamine being released into the capillaries. Copyright Wolke Productions. Used with permission.

Ongoing Assessment (cont.)

In the event patient experiences any reaction **OTHER THAN** hives, itching or rash:

- Stop transfusion and disconnect at catheter hub
- Keep primary IV line open with normal saline
- Re-check identification of patient and compare to blood component bag and Blood Product Record
- Notify Blood Bank of reaction and possible need of retype and crossmatch or additional treatment
- Complete and send to Blood Bank a copy of "Transfusion Reaction Investigation Request" (form #739)
- Send to Blood Bank a copy of all blood product forms used and remaining blood/blood product bag and administration set (remove needle) with attached solutions.

Acute Hemolytic Reaction



Nonhemolytic Febrile Reaction

- This type of reaction does not occur as rapidly as hemolytic and anaphylactic reactions
- 1 to 6 hours after transfusion
- Clinical manifestations:
 - Fever
 - Chills
 - Rash
 - Hives
 - Itching

Ongoing Assessment (cont.)

Obtain/Monitor per M.D. order 1 hour post-transfusion:

- HCT/Hgb: RBCs transfusions
- Platelet count: Platelet transfusion
- Coagulation test: Plasma/cryoprecipitate transfusion

Patient Teaching

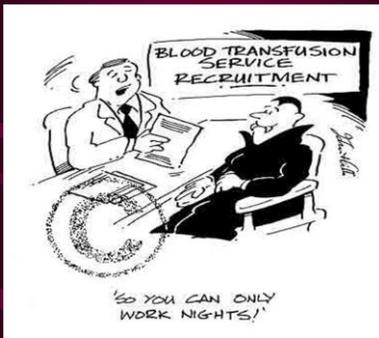
- Instruct patient/family on purpose of transfusion
- Instruct patient to notify nurse for signs and symptoms of transfusion reaction (what are they?)
- Provide preprinted written instructions
- Validate patient's understanding

Transfusion Safety

Transfusion safety is a process that involves different disciplines. A careful management of the patient receiving blood and blood products includes following policies and procedures and staying current with health care trends and innovations designed to improve patient safety.

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Resources



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The End



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- A client receiving PRBCs begins to vomit. The nurse takes the client's blood pressure and it is 90/50 from a baseline of 125/78 mm/Hg. The client's temperature is 100.8° F orally from a baseline of 99.2°F orally. The nurse determines that the client may be experiencing which complication of blood transfusions?
 - a. Septicemia
 - b. Hyperkalemia
 - c. Circulatory overload
 - d. Delayed transfusion reaction

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- The nurse enters a client's room to assess the client who began receiving a blood transfusion 45 minutes earlier. She notes that the client is flushed and dyspneic. On assessment, the nurse auscultates the presence of crackles in the lung bases. The nurse determines that this client most likely is experiencing which complication?
 - a. Bacteremia
 - b. Hypovolemia
 - c. Fluid overload
 - d. Transfusion reaction

3

- The nurse determines that the client is having a transfusion reaction. After the nurse stops the transfusion, which action should be immediately taken next?
 - a. Remove the IV line
 - b. Run normal saline to keep the vein open
 - c. Run a solution of 5% dextrose
 - d. Obtain a culture of the tip of the catheter device removed from the client

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- PRBCs have been ordered for a client with a low hemoglobin and hematocrit. The nurse takes that clients temperature before hanging the blood transfusion and records 100.6°F orally. Which of the following is the appropriate nursing action?
 - a. Begin the transfusion as prescribed
 - b. Delay hanging the blood and notify the MD
 - c. Administer an antihistamine and begin the transfusion
 - d. Administer two tablets of Tylenol and begin the transfusion

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- The nurse is picking up a unit of PRBCs at the hospital blood bank. After putting the pen down, the nurse glances at the clock which reads 1:00. The nurse calculates that the infusion must be started by:
 - a. 1:30
 - b. 2:00
 - c. 2:30
 - d. 3:00

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- The nurse receives a unit of blood at 0800 for transfusion. This unit must be infused by what time?
 - a. 1000
 - b. 1200
 - c. 1400
 - d. 1600

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- The nurse has just obtained a unit of blood from the blood bank to transfuse into a client as ordered. Before preparing the transfusion, the nurse next looks for which of the following members of the health care team to assist in checking the unit of blood?
 - a. Phlebotomist
 - b. Medical student
 - c. Registered nurse
 - d. Blood bank technician

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- The nurse has obtained a unit of PRBCs from the blood bank and has checked the bag properly with another nurse. Before beginning the transfusion the nurse should first:
 - a. Assess vital signs
 - b. Assess skin color
 - c. Assess urine output
 - d. Get the latest hematocrit level

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- The nurse has just received an order to transfuse a unit of PRBCs for an assigned client. Approximately how long will the nurse need to stay with the client to ensure that a transfusion reaction is not occurring?
 - a. 5 minutes
 - b. 15 minutes
 - c. 30 minutes
 - d. 45 minutes

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- A unit of PRBCs has been prescribed for a client with low hemoglobin and hematocrit levels. The nurse notifies the blood bank of the order and a blood specimen is drawn from the client for typing and crossmatching. The nurse receives a telephone call from the blood bank and is informed that the unit of blood is ready for administration. Number the actions in order of priority that the nurse should take to administer the blood:
 - Hang the bag of blood
 - Obtain the unit of blood from the blood bank
 - Ensure that an informed consent has been signed
 - Verify the physician’s order for the blood transfusion
 - Insert an 18-19 gauge IV catheter into the client
 - Ask a licensed nurse to assist in confirming blood compatibility and verifying client ID

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- The client’s physician orders a blood transfusion for a client whose hemoglobin level is 5.0 mg/dL. The nurse informs the client that the blood will be drawn for a type and cross-match prior to the blood transfusion. The client avoids eye contact with the nurse, then states, “I am a Jehovah’s Witness. I thought that was on my chart.” The nurse demonstrates the role of client advocate by which response?
 - a. Your hemoglobin is very low. I can notify your physician to discuss with you how important it is for you to receive the blood.
 - b. I will place that information in your medical record. You have the right to refuse treatment which conflicts with your beliefs. Would you like to speak with your physician about other treatment options?
 - c. Your physician ordered this blood transfusion because your hemoglobin is low. You should do as your physician recommends.
 - d. Why do Jehovah’s Witnesses choose not to receive blood transfusions?

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- A Client receives a blood transfusion through a peripherally inserted central catheter (PICC) line. The blood runs very slowly. Which action by the nurse helps the blood run faster? (Select all that apply).
 - a. Utilize an infusion or pressure pump.
 - b. Add 50 mL of normal saline to the blood.
 - c. Run normal saline with the blood.
 - d. Push the blood manually with a 60-mL syringe.

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- The nurse care for a client receiving a blood transfusion. The nurse notes that the client has become hypotensive and febrile since the transfusion began. Which is the most appropriate nursing action?
 - a. Stop the transfusion.
 - b. Notify the physician.
 - c. Decrease the rate of the transfusion.
 - d. Continue to monitor for signs and symptoms of a transfusion reaction.

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- A postsurgical client requires a blood transfusion. Which disorder is common in critically ill and postsurgical clients requiring blood transfusions?
 - a. Hypercalcemia
 - b. Hyperkalemia
 - c. Hypocalcemia
 - d. Hypokalemia

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- A client has no antibodies in the blood when tested for crossmatch. Which blood type is this client?
 - a. Type A
 - b. Type B
 - c. Type AB
 - d. Type O

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- The client's Type and Crossmatch report indicates he is Type A+. The unit of PRBCs the blood bank has provided is labeled as Type O -. Can client safely receive this blood?
 - a. True
 - b. False

References

- Houck, D. & Whiteford, J. (2007). Improving patient outcomes: Transfusion with infusion pump for peripherally inserted central catheters and other vascular access devices. *Journal of Infusion Nursing, 30*(6), 341-344.
- <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2738319/>
- <http://www.redcrossblood.org/donating-blood/eligibility-requirements/eligibility-criteria-alphabetical-listing>
- <http://www.redcrossblood.org/learn-about-blood/blood-types>
- Lewis, S.M., Heitkemper, M.M., & Dirksen, S.R. (2004). *Medical surgical nursing: Assessment and management of clinical problems*. St. Louis: Mosby.
- Los Angeles County - University of Southern California Healthcare Network, Department of Education and Consulting Services and Blood Bank and Blood Utilization Committee (2011). *Safe Transfusion Practices Module*.
- Szazma, R., DeChristopher, P. J., Dodd, R., Harrison, C. R., Shulman, I. A., Cooper, E. S., et al. (2000). Practice parameter for the recognition, management, and prevention of adverse consequences of blood transfusion. *Arch Pathol Lab Med, 124*.
- Simmons, P. (2003). A primer for nurses who administer blood products. *Medical surgical nursing, June 2003*.
- <https://www.youtube.com/watch?v=PB8fPqmxBU>
- <https://www.youtube.com/watch?v=frYwXcLy5vc>
